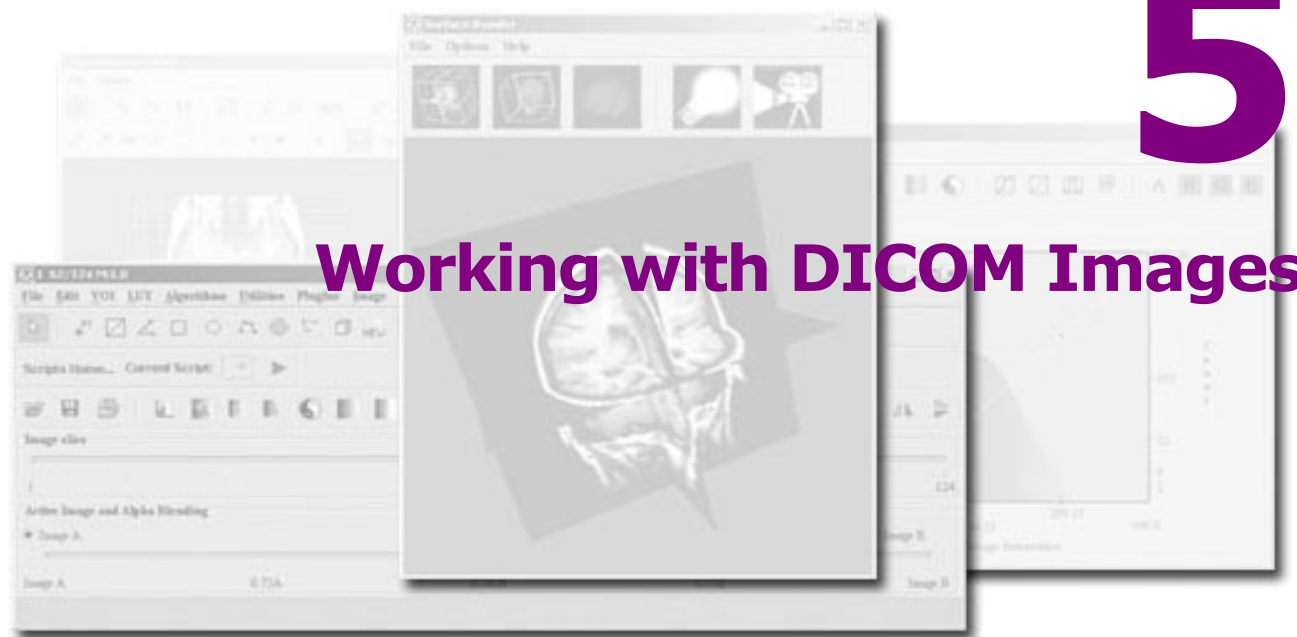


# 5



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## In this chapter . . .

- "Understanding how MIPAV works with DICOM images" on page 132
  - "Browsing DICOM images" on page 133
  - "Sending and retrieving DICOM images" on page 141
  - "Testing the connection" on page 154
  - "Posing queries and retrieving images" on page 156
  - "Receiving and sending image files" on page 160
  - "Displaying and editing DICOM tag information" on page 163
  - "Protecting patient privacy using Anonymize" on page 169
  - "Converting non-DICOM image files to DICOM format" on page 180
- 

Digital Image Communication in Medicine (DICOM) defines a standard method of transmitting digital medical-image information between devices, such as computers, servers, or imaging equipment. The standard not only prescribes how to communicate with other imaging equipment and databases, but also how to store images.

This chapter discusses how MIPAV works with DICOM images. It explains how to browse DICOM images and send and retrieve DICOM images, which includes the following tasks:

- Setting up a hosts table to indicate where you want to send images (“Setting up the hosts table” on page 144)
- Testing server connections (“Testing the connection” on page 154)
- Posing queries and retrieving DICOM images (“Posing queries and retrieving images” on page 156 and “Receiving and sending image files” on page 160)
- Sending DICOM images to another device (“To send image files” on page 161)

It also explains how to edit DICOM tags, protect patient privacy by removing DICOM tag information from images, and convert image formats, such as Analyze or TIFF, to DICOM format.

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## Understanding how MIPAV works with DICOM images

You can use MIPAV to access images and information that were generated by DICOM-compatible imaging equipment. Some researchers at NIH use MIPAV to access DICOM-compatible archive systems, such as the Kodak Cemax-Icon Picture Archiving and Communication System (PACS), which includes the AutoRad devices located in the NIH clinical center. The PACS system consists of software, hardware, and networks. PACS provides the means for medical specialists to digitally acquire images, transmit the images and image-related data using a communications network, display and interpret images, and store and retrieve images. PACS also provides an interface to other systems that contain patient data.



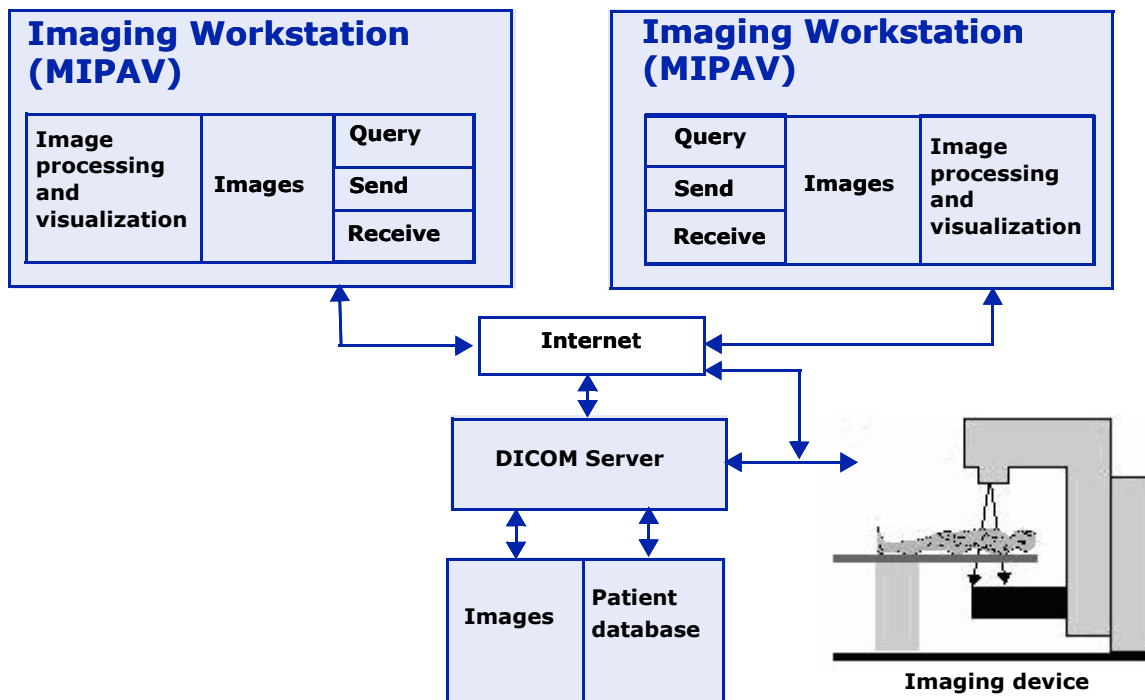
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**Note:** The DICOM standard is detailed in the 16-part documentation set *Digital Imaging and Communications in Medicine (DICOM) Standard* (refer to Appendix B, DICOM Conformance Statement.) MIPAV is DICOM version 3.0 compliant. Compliance information appears in Appendix B of this document.

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Figure 88 diagrams the communication pathways between MIPAV, the internet, a DICOM-compatible server, a patient database, an imaging device, and a remote MIPAV workstation.

Digital images are acquired on a medical imaging device, such as a Computed Tomography (CT) scanner. The image can remain on the device or be transferred via a DICOM-compatible server to a patient database or other archive media. Once the image is acquired and stored, you can then use MIPAV to query and retrieve, receive, or send DICOM image files.



**Figure 88. Communication pathways between MIPAV and DICOM**

## Browsing DICOM images

MIPAV includes a browser that is specifically designed for examining DICOM images. The DICOM browser allows you to view a list of all of the

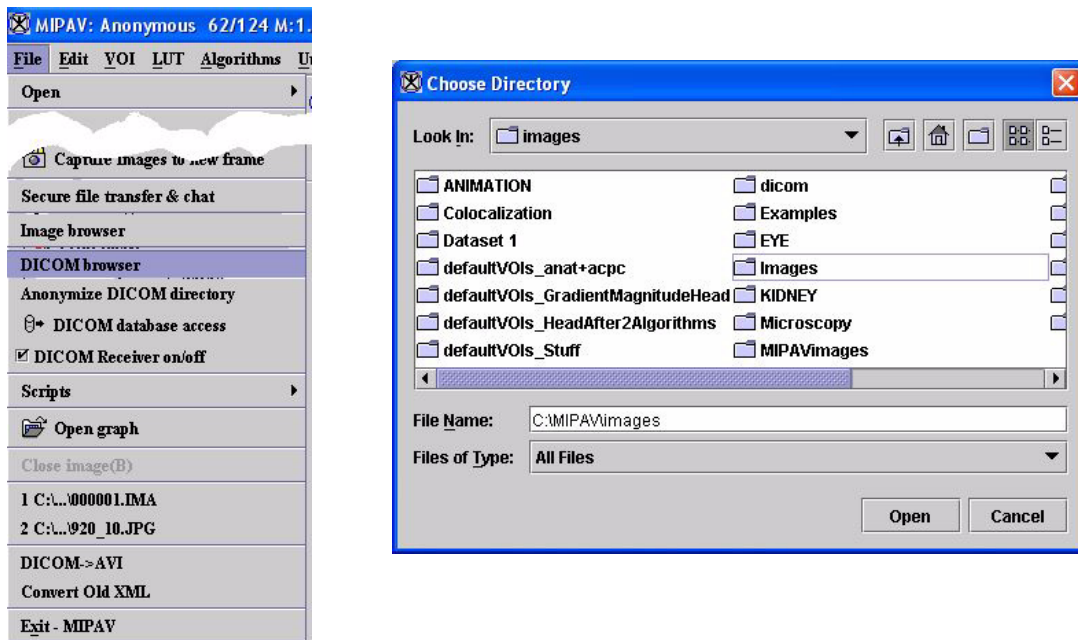
images in a dataset and quickly display each one individually. The browser provides a fast way of locating and selecting specific image slices.



**Tip:** You can open a DICOM browser at any time after starting MIPAV; and, depending on your computer's memory resources, you can open more than one DICOM browser.


## To display an image dataset in the DICOM browser

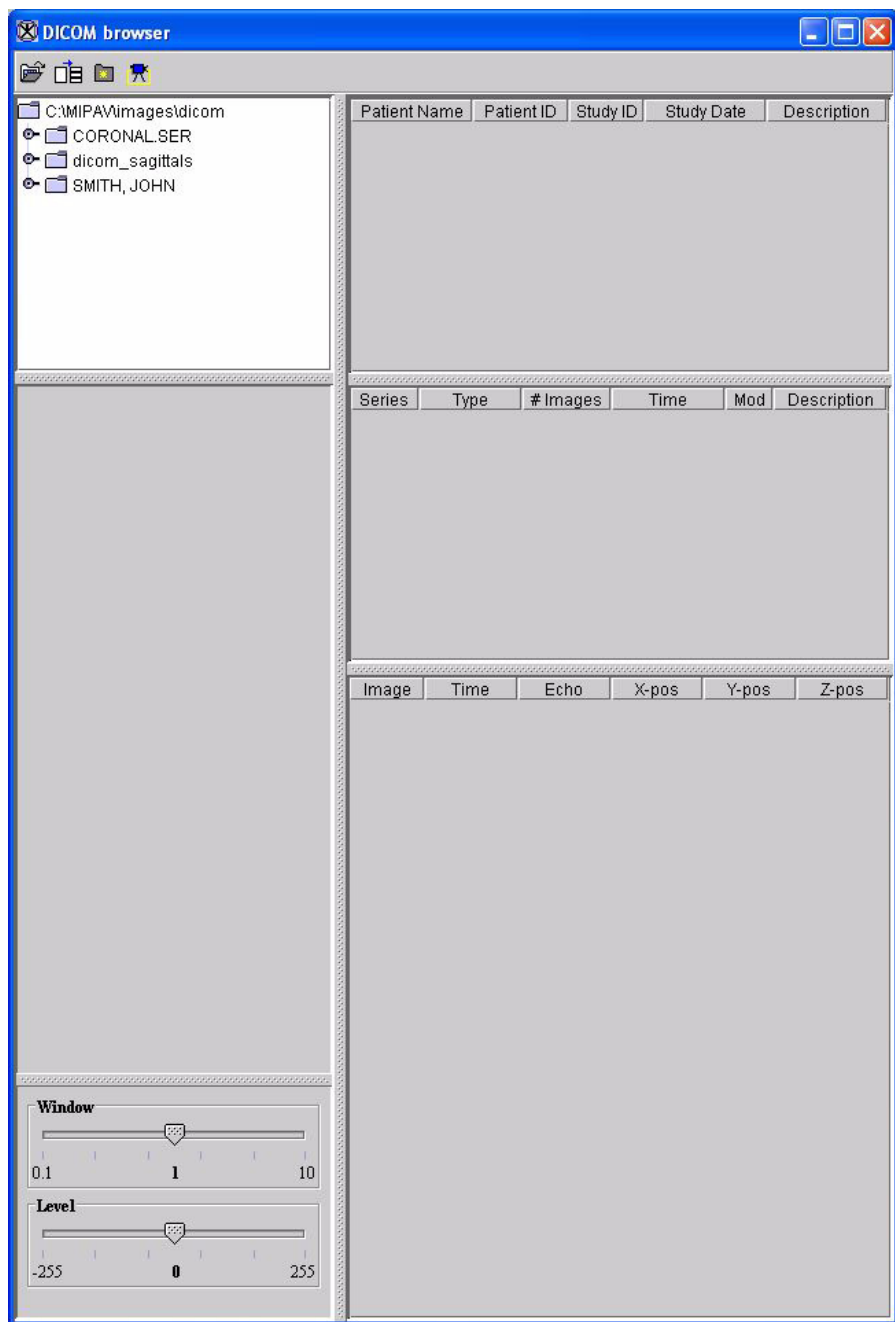
- 1 Select File > DICOM browser (Figure 89). The Choose Directory dialog box (Figure 89) opens.



**Figure 89. DICOM Browser command on the File menu (left) brings up the Choose Directory dialog box (right)**

- 2 Select the directory in which the DICOM image datasets are stored.
- 3 Click Open. The DICOM browser (Figure 90) appears showing the directory tree in the panel on the upper left of the window.
- 4 Navigate, if necessary, to the correct subdirectory and select it.

- 5 Select Parse directory, . Information appears in the three panels on the right side of the window (Figure 91): patient and study information at the top, dataset information in the middle, and image information at the bottom.
- 6 Select one of the images listed in the image information panel. The image appears in the panel on the left side of the window below the tree structure (Figure 91).



**Figure 90. DICOM browser as it appears before parsing a directory**

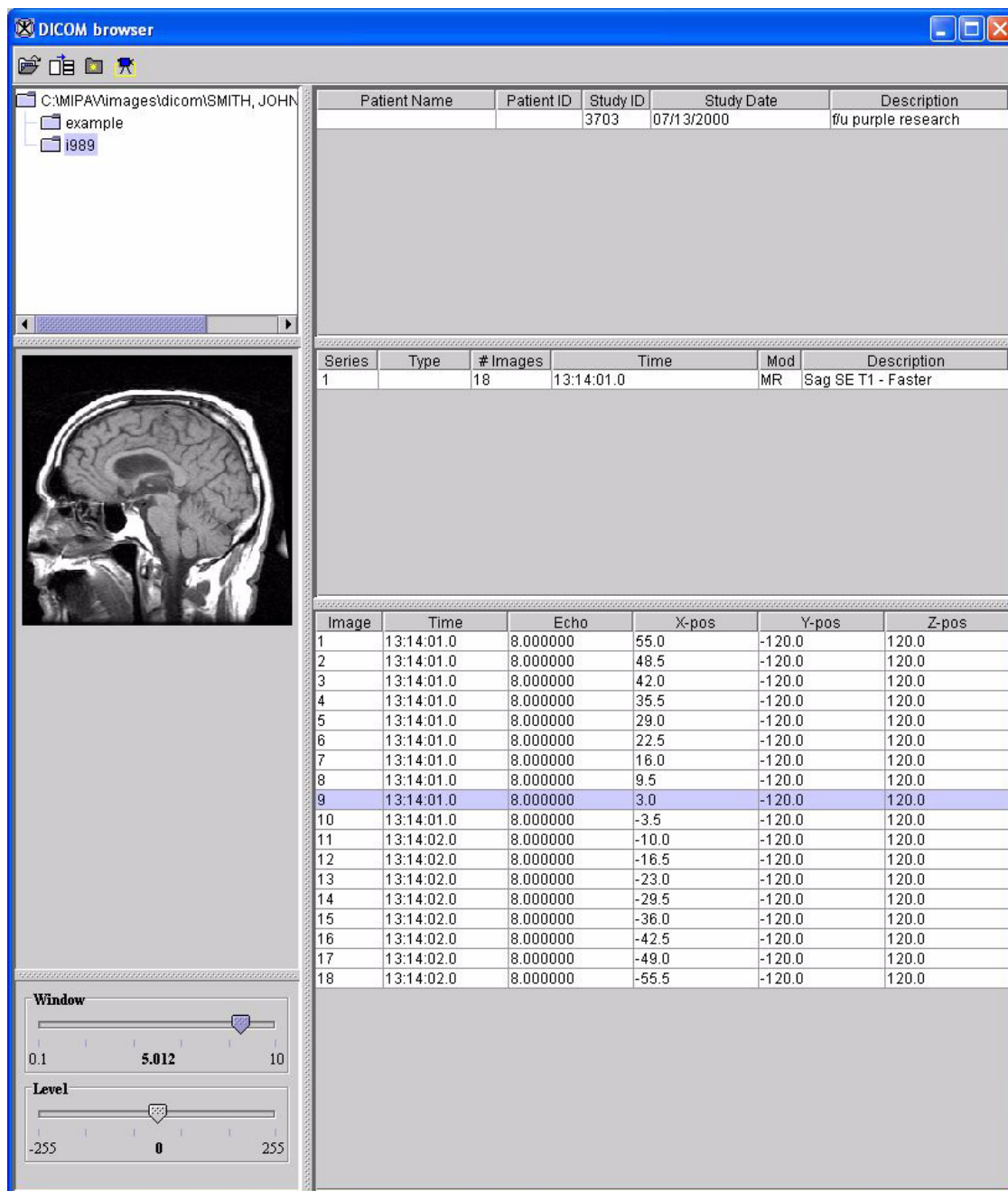


Figure 91. DICOM browser after parsing a directory and selecting an image to display



**Tip:** You can select consecutive images by clicking the first image, pressing and holding down Shift, and then clicking the last image. To select nonconsecutive images, press and hold down Ctrl and then click each image

You can now continue to browse the images, or you can perform one or more of the following tasks:

- Adjust the image contrast and brightness
- Open selected images
- View another image dataset
- Create a movie from the image dataset

### **To adjust image contrast and brightness in the DICOM browser**

The Window and Level sliders that appear in the left bottom panel of the DICOM browser allow you to adjust both the contrast and brightness in the image being displayed.


- 1 Select an image from the image listing in the DICOM browser.
- 2 Move the Window slider to the right to lessen contrast or to the left to intensify contrast.
- 3 Move the Level slider to the right to increase brightness or to the left to decrease brightness.

### **To open selected images in the image dataset in the DICOM browser**



One of the advantages of using the DICOM browser is that you can quickly identify which images in the dataset you want to work with. Once you've determined the required images, you can open just the slices you selected.

- 1 Display an image dataset in the DICOM browser.
- 2 Browse through all of the images in the dataset to identify the slice numbers of the images.




- 3 Select each of the appropriate slice numbers.
- 4 Select , the Open selected images icon. MIPAV opens all of the slices in an image window. You can now use the Image Slice slider in the MIPAV window to view and work with each slice.

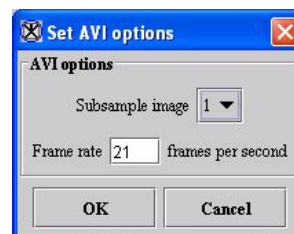
### To view another image dataset in the DICOM browser

- 1 Click , the New top directory icon. The Choose Directory dialog box opens.
- 2 Select the directory in which the other DICOM image dataset is stored.
- 3 Click Open. The DICOM browser appears showing the directory tree in the panel on the upper left of the window.
- 4 Navigate, if necessary, to the correct subdirectory and select it.
- 5 Select Parse directory, . Information about the new image dataset replaces the information about the previous dataset in the three panels on the right of the window.

### To create a movie from the image dataset

- 1 Obtain and install, if you have not already done so, the following file from the Sun Java web site:  
  
jmf-2\_1\_1e-windows-i586.exe  
  
Double-click the file to install it on your computer. This file installs the necessary file formats for creating movies.
- 2 Display an image dataset in the DICOM browser.
- 3 Browse through all of the images in the dataset to identify the slice numbers of the images you want to appear in the movie.
- 4 Select each of the appropriate slice numbers.
- 5 Select , the Extract image to AVI movies icon. The Set AVI Options dialog box (Figure 92) opens.
- 6 Specify whether to subsample the image by 1, 2, 3, or 4.

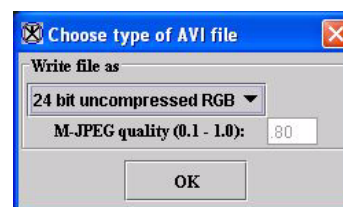
<b>Subsample image</b>	Subsamples each image dimension by a factor of 1, 2, 3, or 4.
<b>Frame rate</b>	Specifies how many frames, or slices, should appear in 1 second.
<b>OK</b>	Applies the parameters that you specified.
<b>Cancel</b>	Disregards any changes you made in this dialog box, closes the dialog box, and does not save the file.
<b>Help</b>	Displays online help for this dialog box.



**Figure 92. Set AVI Options dialog box**

- 7 Click OK. The Save dialog box opens.
- 8 Type a name for the movie in File Name.
- 9 Click Save. The Choose Type of AVI File dialog box (Figure 93) opens.
- 10 Select one of the methods of writing the file.

<b>Write file as</b>	<p>Specifies the file format in which to save the movie. Choose one of the following:</p> <ul style="list-style-type: none"> <li>• 24-bit uncompressed RGB</li> <li>• 8-bit RLE with LUT</li> <li>• Quicktime movie</li> <li>• M-JPEG</li> <li>• IR32</li> <li>• IR41</li> <li>• Indeo Video 5</li> <li>• MS-MPEG4 V1</li> </ul>
<b>M-JPEG quality (0.1 - 1.0)</b>	Specifies the level of quality, which may be from 0.1 to 1.0, in the M-JPEG file type. This box is only available if you selected M-JPEG in the Write file as box.
<b>OK</b>	Applies the parameters that you specified.
<b>Cancel</b>	Disregards any changes you made in this dialog box, closes the dialog box, and does not save the file.
<b>Help</b>	Displays online help for this dialog box.

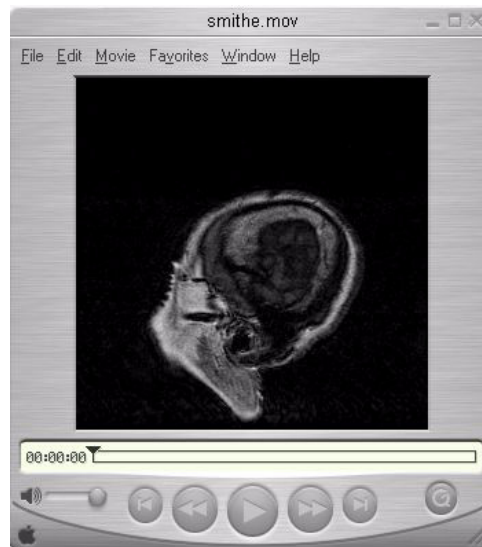


**Figure 93. Choose Type of AVI File dialog box**

**11** Type the value for the M-JPEG quality if you selected M-JPEG as the writing method.

**12** Click OK. A pop-up window appears with the status.

When the algorithm finishes running, the pop-up window closes. The movie is saved in the directory you specified, and, depending on the file format, the movie may appear in a new window.



**Figure 94. Quicktime movie—one of the eight file formats for making movies from DICOM images**

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## Sending and retrieving DICOM images

You can use MIPAV to query a DICOM-compatible archive or an imaging device that has, or is connected to, a DICOM server. A DICOM server is an application that processes DICOM query and retrieve requests. Because MIPAV is not equipped with a server, you cannot use this process to obtain DICOM files from another researcher who is also using MIPAV. You must use the receive process outlined in “Receiving and sending image files” on page 160 instead. You can then select images from the query results and store them on your hard drive or another destination.

---

The tasks involved in sending and retrieving DICOM images include the following:

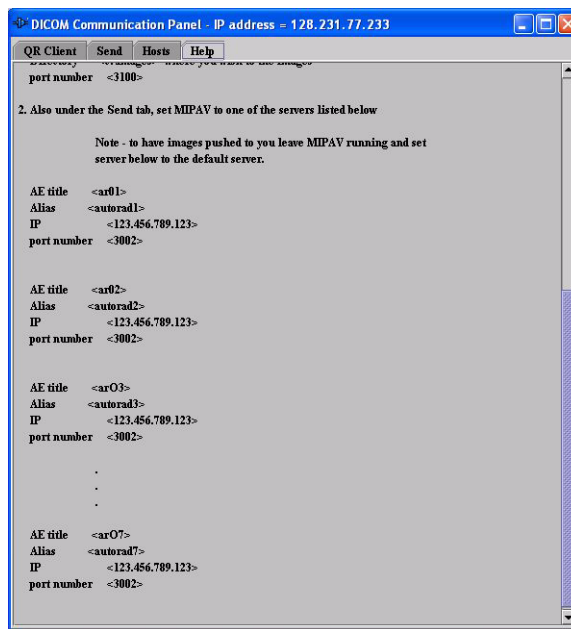
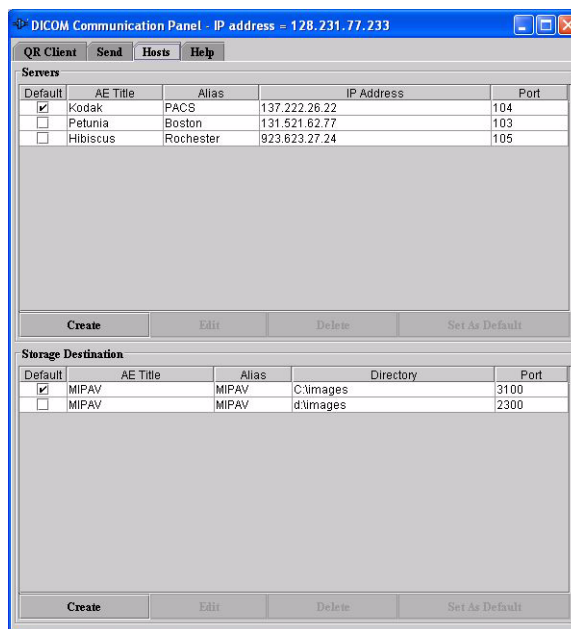
- Setting up the hosts table
- Testing server connections
- Posing queries and retrieving images
- Receiving and sending image files

To set up the hosts table and to query, retrieve, receive, and send DICOM files, you use the DICOM Communication Panel dialog box. To view this dialog box, select File > DICOM Database Access in the MIPAV window. The DICOM Communication Panel dialog box (Figure 95) opens.

This dialog box includes four tabbed pages:

- **QR Client**, which appears by default when the dialog box is first opened. Use this page to search for an image for a particular patient, physician, and time period.
- **Send**, which allows you to select the files to be sent to the DICOM imaging device, to select the specific imaging device from a list of available devices to which you want to send the files, and to send the files. This page also allows you to test the connection to the device that you selected.
- **Hosts**, which allows you to create a servers to which you are connected, edit the settings for servers, delete servers, and set the default server. It also allows you to create, edit, or delete storage destinations and set the default storage destination.
- **Help**, which provides instructions for setting up the hosts table and for sending and receiving images.

The following sections discuss these pages and explain in detail the contents of each page and how to use them.



**Figure 95. The four pages in the DICOM Communication Panel dialog box**

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## Setting up the hosts table

Before creating queries or receiving and sending images, you must set up the hosts table, which is on the Hosts page (Figure 96) in the DICOM Communication Panel dialog box. The hosts table stores information (application entity [AE] title, alias, IP address, and port number) about the devices to which you want to connect. Conversely, your computer's connection information must be stored in the hosts table of the devices to which you want to connect. Note that the title bar for the DICOM Communication Panel dialog box contains the internet protocol (IP) address for your workstation.



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**internet protocol (IP) address:** A numeric ID that is used to identify your computer on a Transmission Control Protocol/Internet Protocol (TCP/IP) network. An example of a TCP/IP network is the internet.

---

To display the Hosts page, select the Hosts tab in the dialog box. The Hosts page, shown in Figure 96, appears.

The Servers panel on the Hosts page includes fields that contain identifying information for the devices to which you want to connect. (Although the panel is named Server, you should create an entry for any type of device to which you want to connect.) The Storage Destination panel holds entries that indicate where you want images to be stored once you retrieve or receive them.

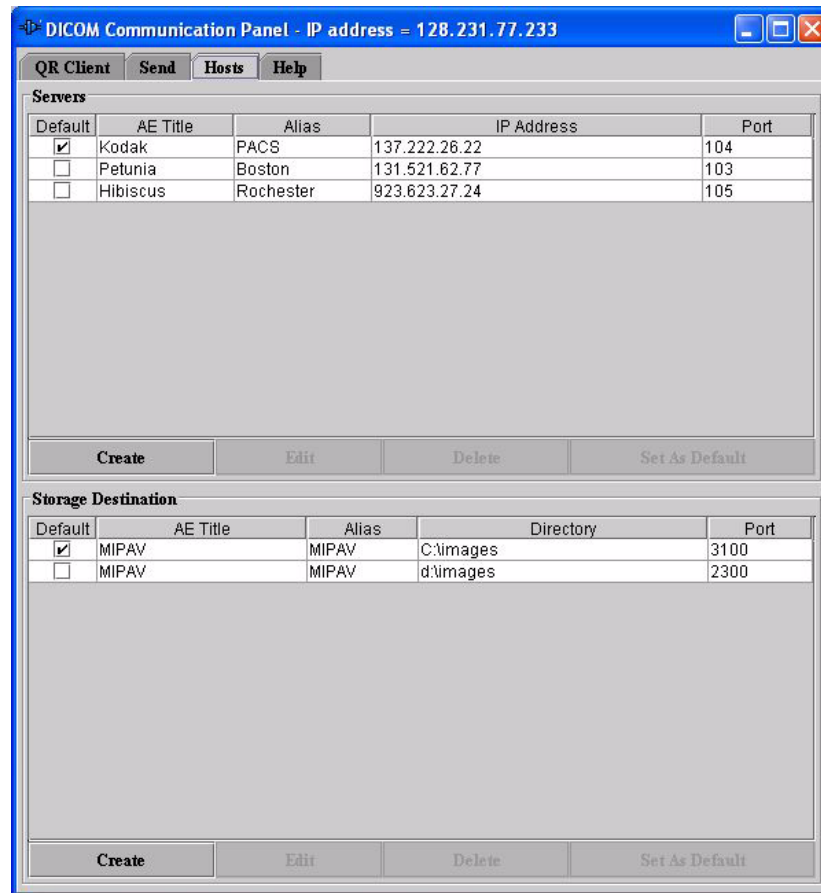
The following sections explain how to:

- Create, edit, or delete entries in the Servers panel
- Create, edit, or delete entries in the Storage Destination panel

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## CREATING, EDITING, AND DELETING SERVERS

You can create, edit, and delete entries in the Servers panel on the Hosts page (Figure 96). You must create an entry if you want to use MIPAV to query a server.



## Servers

**Default**—Indicates that the device is the default. When you pose a query, data is sent to the default device.

**AE Title**—Lists the title of the device's DICOM application entity. The AE Title is often set by the device's system administrator. The hosts table associates the AE Title with the IP address. The AE Title can be 16 alphanumeric characters or less.

**Note that the AE Title is case sensitive.**

**Alias**—Specifies the alternative name for the device. The alternative name can be up to 16 alphanumeric characters.

**IP Address**—Specifies the internet protocol address for the device. An IP address identifies a device on a Transmission Control Protocol/Internet Protocol (TCP/IP) network. (An example of a TCP/IP network is the internet.) The hosts table associates the IP address with the AE Title. IP addresses are written as four numbers separated by periods.

**Figure 96. Hosts page in the DICOM Communication Panel dialog box**

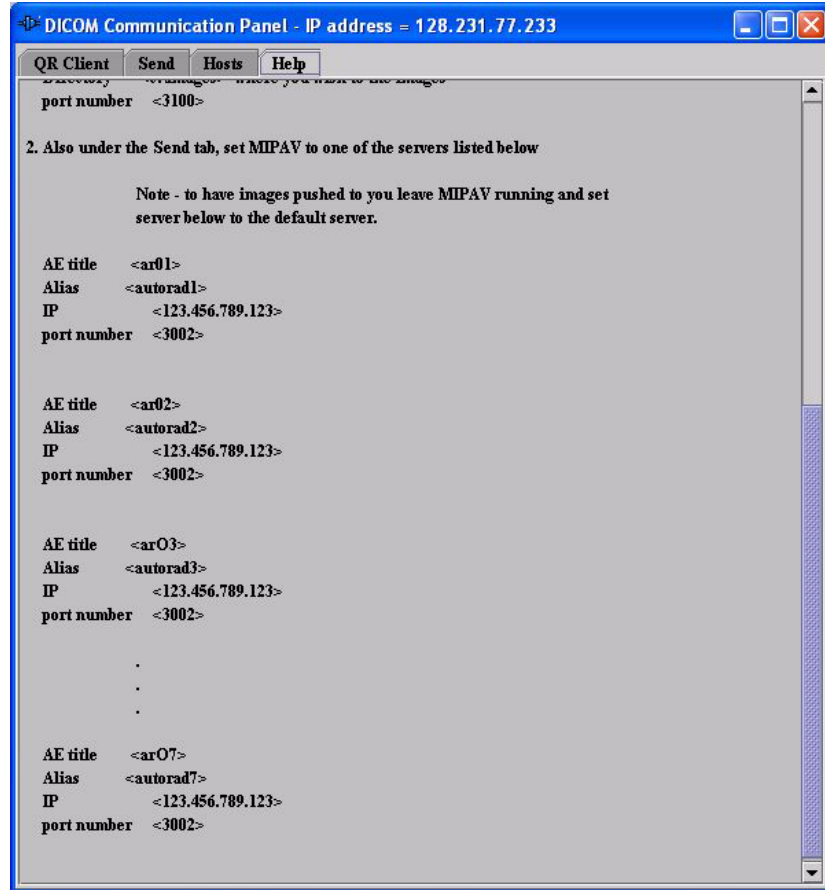
	<b>Port</b> —Identifies the port for the device's application program that you query, retrieve, receive, and send image files. A port is a logical connection endpoint that is the means that a program uses to identify a specific program running on a computer on a network (such as TCP/IP).
<b>Create</b>	Allows you to add a new DICOM server. When you click Create, the Create Server dialog box opens.
<b>Edit</b>	Allows you to edit a currently listed DICOM server. When you select the server you want to modify and click this button, the Edit Server dialog box appears.
<b>Delete</b>	Deletes the DICOM server from the list of servers. To delete a server, select the server and then click this button. A message appears asking you to confirm the deletion.
<b>Set as default</b>	Allows you to select the server to be used as the default server. Select a server and then click this button. The check mark moves to the Default check box beside the server you selected.
<b>Storage destination</b>	<b>Default</b> —Indicates, when selected, the default storage destination. When you retrieve or receive image data, it is stored in the default storage destination.
	<b>AE Title</b> —Lists the title of the DICOM application entity. If the storage destination is on your machine, the AE title is typically preceded by MIPAV_. An example of a valid AE title is MIPAVSMITH23. The AE Title can be 16 alphanumeric characters or less. <b>Note that the AE Title is case sensitive.</b>
	<b>Alias</b> —Specifies an alternative name for the storage destination. Alphanumeric characters are accepted.
	<b>Directory</b> —Shows the full path name of the directory where images are stored. Alphanumeric characters are accepted.
	<b>Port</b> —Identifies the port that your computer uses to receive images. By default, the port number is 3100.
<b>Create</b>	Allows you to add a new storage location. When you click Create, the Create Storage Destination dialog box appears.
<b>Edit</b>	Lets you modify a listed storage location. Select the location you want to modify and click this button. The Edit Storage Destination dialog box opens.
<b>Delete</b>	Allow you to delete a listed storage location. To delete a storage location, select the location and then click this button.
<b>Set as default</b>	Allows you to select the storage location that is used by default. Select the location and click this button. The check mark moves from the current default location to the Default check box beside the location you selected.

**Figure 96. Hosts page in the DICOM Communication Panel dialog box (continued)**

Before you begin, obtain the AE title, alias, IP address, and port number of the device to which you want to connect. The connection information for the



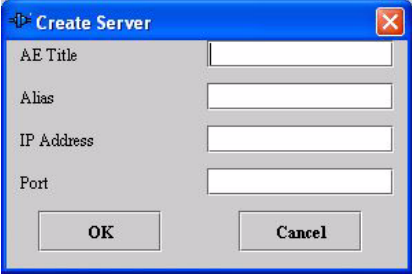
NIH Kodak Cemax-Icon PACS appears when you click the Help tab. The Help page appears (Figure 97). You must also contact the administrator of the device (including the NIH Kodak Cemax-Icon PACS) so that your connection information can be stored in their hosts table as well. Once you have all of the information, you can create an entry in the hosts table entry.



**Figure 97. The Help page in the DICOM Communications Panel dialog box**

## To create servers in the Server panel

- 1 Click Create in the Servers panel on the Hosts page in the DICOM Communications Panel dialog box. The Create Server dialog box opens (Figure 98).

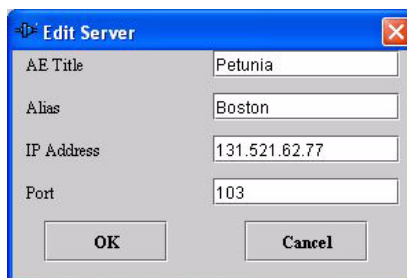
<b>AE title</b>	Lists the title of the device's DICOM application entity. The AE Title is often set by the device's system administrator. The hosts table associates the AE Title with the IP address. The AE Title can be 16 alphanumeric characters or less. <b>Note that the AE Title is case sensitive.</b>	
<b>Alias</b>	Specifies the alternative name for the device. The alternative name can be up to 16 alphanumeric characters.	
<b>Address</b>	Specifies the internet protocol (IP) address for the device. An IP address identifies a device on a Transmission Control Protocol/Internet Protocol (TCP/IP) network. (An example of a TCP/IP network is the internet.) The hosts table associates the IP address with the AE Title. IP addresses are written as four numbers separated by periods.	
<b>Port</b>	Identifies the port for the device's application program that you query, retrieve, receive, and send image files. A port is a logical connection endpoint that is the means that a program uses to identify a specific program running on a computer on a network (such as TCP/IP).	
<b>OK</b>	Applies the parameters that you specified and creates a new server.	
<b>Cancel</b>	Disregards any changes you made in this dialog box, closes the dialog box, and does not create a server.	
<b>Help</b>	Displays online help for this dialog box.	

**Figure 98. Create Server dialog box**

- 2 Type the required information in AE Title, Alias, IP Address, and Port (refer to Figure 96 for information on these fields).
- 3 Click OK when complete. The Create Server dialog box closes and the entry appears in the Servers panel.

## To edit servers in the Servers panel

- 1 Select the server in the Servers panel that you want to edit.
- 2 Click Edit. The Edit Server dialog box opens.



**Figure 99. Edit Server dialog box**

- 3** Modify the information in AE Title, Alias, IP Address, and Port as required.
- 4** Click OK. The Edit Server dialog box closes, and the changed entry appears in the Server panel.

### To delete servers

- 1** Select the server in the Servers panel that you want to delete.
- 2** Click Delete. The Confirm Delete message (Figure 100) opens.
- 3** Click Yes. MIPAV deletes the server from the Servers panel.



**Figure 100. Confirm Delete message**

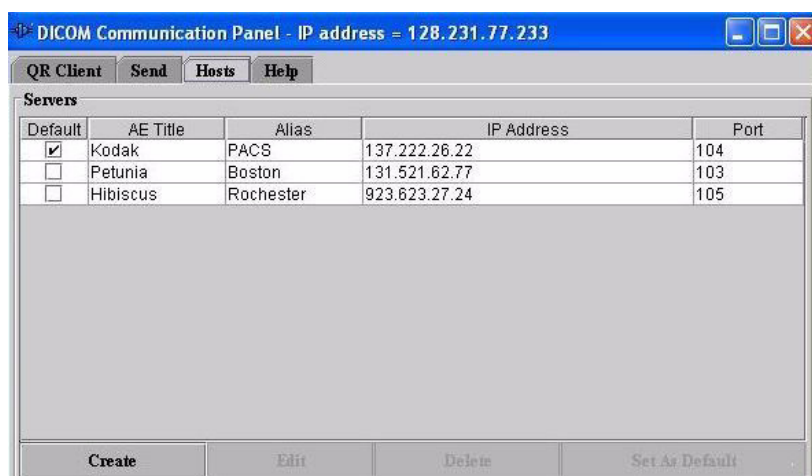
### To select a default server

A default server is the server that is automatically selected when you first display the Hosts page of the DICOM Communications Panel dialog box. Unless you select another server as the default, it is the server to which MIPAV automatically sends images.

You can select the default server in either of the following ways:

- Double-click the server that you want as the default server in the Server panel.
- Select the server in the Servers panel that you want as the default server. The server is highlighted. Click Default.

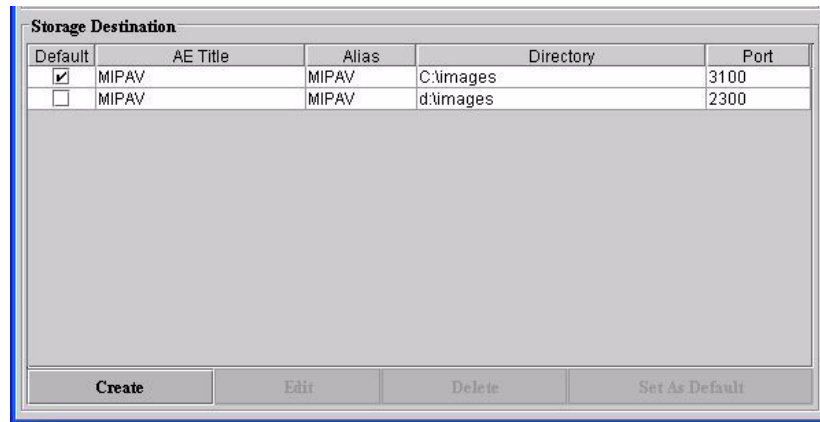
A check mark moves from the check box for the previous default server to the Default check box beside the server you selected.



**Figure 101. Default server in the Servers panel on the Hosts page**

## CREATING, EDITING, AND DELETING STORAGE DESTINATION ENTRIES

You can create, edit, and delete storage destination entries in the Storage Destination panel of the Hosts tabbed window (Figure 102). The storage destination indicates where to store the image files you retrieve or receive. You must create at least one storage destination.



**Figure 102. Storage Destination panel**

### To create storage destinations

- 1 Click Create in the Storage Destination panel on the Hosts page in the DICOM Communications Panel dialog box. The Create Storage Destination window opens (Figure 103).
- 2 Type the required information in AE Title, Alias, Directory, and Port (refer to Figure 103 for information about these fields).
- 3 Click OK when complete. The Create Storage Destination dialog box closes. The new entry appears in the Storage Destination panel.

<b>AE title</b>	Lists the title of the device's DICOM application entity. The AE Title is often set by the device's system administrator. The hosts table associates the AE Title with the IP address. The AE Title can be 16 alphanumeric characters or less. Note that the AE Title is case sensitive.	
<b>Alias</b>	Specifies the alternative name for the device. The alternative name can be up to 16 alphanumeric characters.	
<b>Directory</b>	Shows the full path name of the directory where images are stored. Alphanumeric characters are accepted.	

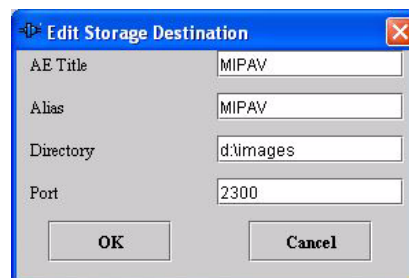
**Figure 103. Create Storage Destination dialog box**

<b>Port</b>	Identifies the port for the device's application program that you query, retrieve, receive, and send image files. A port is a logical connection endpoint that is the means that a program uses to identify a specific program running on a computer on a network (such as TCP/IP).
<b>OK</b>	Applies the parameters that you specified and creates a new server.
<b>Cancel</b>	Disregards any changes you made in this dialog box, closes the dialog box, and does not create a server.
<b>Help</b>	Displays online help for this dialog box.

**Figure 103. Create Storage Destination dialog box (continued)**

## To edit storage destinations

- 1 Select the storage destination in the Storage Destination panel that you want to change.
- 2 Click Edit. The Edit Storage Destination dialog box (Figure 104) opens.



**Figure 104. Edit Storage Destination dialog box**

- 3 Modify the information in AE Title, Alias, Directory, and Port as required.
- 4 Click OK when complete. The Edit Storage Destination dialog box closes. The modified information appears in the Storage Destination panel.

## To delete storage destinations

- 1 Select the storage destination in the Storage Destination panel that you want to delete.
- 2 Click Delete. A Confirm Delete message opens (Figure 105).



**Figure 105. Confirm Delete message**

- 3 Click Yes. MIPAV deletes the storage destination from the Storage Destination panel.

## To select a default storage destination

A default storage destination is the one that is automatically selected when you initially display the Hosts page of the DICOM Communications Panel dialog box. Unless you select another storage destination as the default, MIPAV automatically stores images in this location.

You can select the default storage destination in either of the following ways:

- Double-click the entry that you want as the default storage destination in the Storage Destination panel.
- Select the entry in the Storage Destination panel that you want as the default storage destination. The server is highlighted. Click Default.

A check mark moves from the check box for the previous default storage destination to the Default check box beside the storage destination you selected.

---

## Testing the connection

Before querying, retrieving, or sending images, you may want to test the connection between your machine and the device that you want to receive the images.

### To test the connection

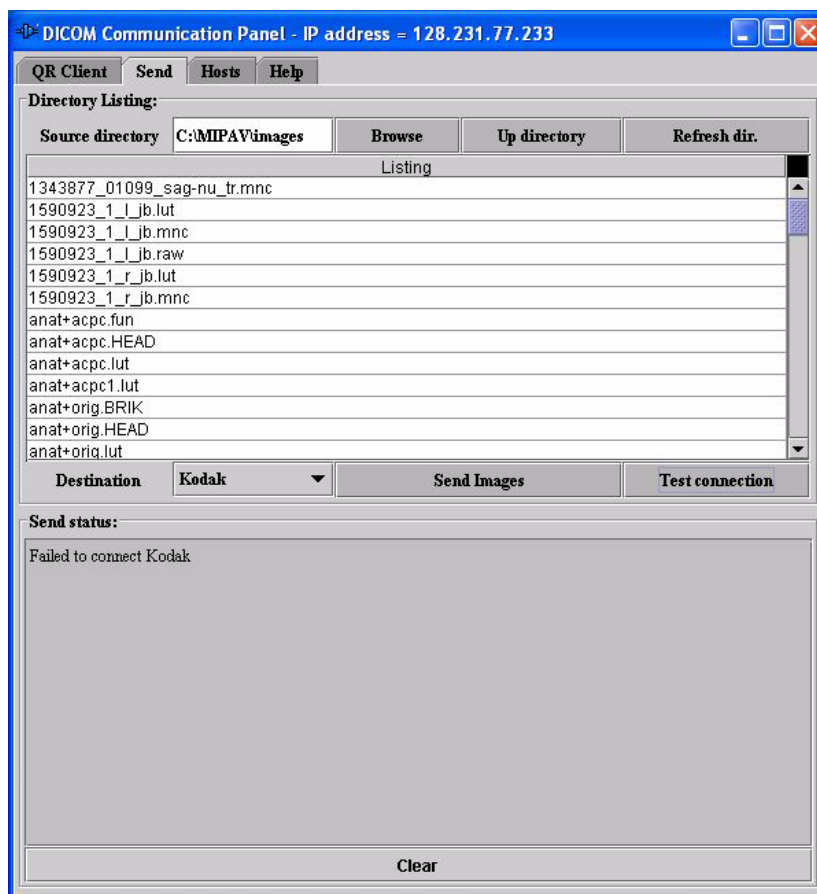
- 1 Click Send in the DICOM Communication Panel dialog box. The Send page (Figure 95 and Figure 106) appears.
- 2 Select the pathway you want to test by selecting the destination from the drop-down list near the center of the Send tabbed window. The destinations are the entries from the Servers panel in the Hosts tabbed window.
- 3 Click Test connection.
- 4 If there is a problem, connection failure messages appear in the Send status panel as shown in Figure 106.

### To resolve connection errors

Do the following:

- Make sure the AE Title, Alias, IP Address, and Port number for the device are entered correctly in your hosts table.
- Contact your system administrator for the device to which you want to send the images. Make sure your AE Title, Alias, IP Address, and Port number was correctly added to the hosts table for that device.
- If you are attempting to send images to another MIPAV machine, make sure that the receiver in the other MIPAV application is turned on. To turn on the receiver, ask them to select File > DICOM Receiver On/Off in the MIPAV window.





**Figure 106. Error message in the Send status panel on the Send page**

---

## Posing queries and retrieving images

Use the QR Client page (Figure 107) in the DICOM Communication Panel dialog box to query a DICOM-compatible server, or device, and then retrieve files from the query results.



---

**Note:** Before you begin, make sure your hosts table has the name of the device you want to query or from which you want to receive images. Conversely, your computer's connection information should also be in the other device's hosts table. For more information on setting up a hosts table, see "Setting up the hosts table" on page 144

---

### To pose queries

- 1 Click QR Client in the DICOM Communication Panel dialog box. The QR Client page appears (Figure 107).
- 2 Construct your query by completing the fields in the Patient Query Information and Query Duration panels. As you fill in the information, keep the following in mind:
  - You must specify at least one of the following: patient name, patient ID, study number, or physician.
  - If the exact name, ID, or study number is not known, you can use the asterisk as a wildcard character. For example, if you type **\*o\*ston** in the patient name field, all names that match this pattern, such as Houston or Johnston, appear in the result.
- 3 Click Send Query.

The query result appears in the Query Result panel. To retrieve images, go to "To retrieve images" on page 159.

### To erase the query

To erase the query and start again, click Clear in the Patient Query Information panel.

### Patient Query Information

<b>Patient Name</b>	Indicates the full name of the patient. Alphanumeric characters are accepted. You can use an asterisk as a wild card character.
<b>Patient ID</b>	Indicates the primary hospital identification number or code for the patient. Numeric characters are accepted.
<b>Study Number</b>	Displays the user- or equipment-generated study identifier.
<b>Physician</b>	Indicates the physician(s) responsible for patient care at the time of the study.

### Query Duration

<b>Query Duration</b>	Displays the time period the query covers.
<b>Start Date</b>	Indicates the date when medical specialist began acquiring study information.

**Figure 107. QR Client page in the DICOM Communication Panel dialog box**

<b>End Date</b>	Indicates the date when medical specialist completed the acquisition of study information.
<b>Today's Date</b>	Displays the current date.
<b>Query Result</b>	
<b>Pat. Name</b>	Patient Name. Indicates the full name of the patient. You cannot edit this field; it is read-only.
<b>Pat. ID</b>	Patient Identification. Displays the primary hospital identification number or code for the patient. You cannot edit this field; it is read-only.
<b>Referring Physician</b>	Indicates the name of the physician who referred the patient. You cannot edit this field; it is read-only.
<b>Query Retrieval Information</b>	
<b>Status</b>	Provides an update of the query retrieval process.
<b>#</b>	Indicates the image number that is currently being retrieved.
<b>Source</b>	Indicates the DICOM server from which the images are being retrieved.
<b>Destination</b>	Indicates where the image is stored (storage destination).
<b>Error</b>	Indicates whether an error has occurred.
<b>ID</b>	Displays the unique ID that is assigned to each query.

**Figure 107. QR Client page in the DICOM Communication Panel dialog box (continued)**

### To view information at different levels

You can view information at the patient, study, series, or image level. To go up or down a level, click Up or Down. Note that the level that is currently displayed appears at the left of the Up and Down buttons.

### To sort the query result list

Click Pat (patient), Pat ID (patient ID), or Referring Physician in the Query Result panel. The query result list is sorted in ascending order based on the column you chose.

If you click the column title a second time, the list is resorted, this time in descending order, but again based on the title you chose.

---

## To retrieve images

After you pose a query and receive the results, you can select the files that you want to retrieve from the list of query results.

- 1 Turn on the DICOM receiver if you have not already done so.

To turn on the receiver, click File > DICOM Receiver On/Off in the MIPAV window. A check mark appears next to the option.

- 2 Select the images you want to copy from the Query Result panel on the QR Client page.
- 3 Click Retrieve Image in the Patient Query Information panel to copy the images to the default storage destination indicated in the hosts table.

If you need to check the default storage destination:

- a Click Hosts to display the Hosts page
- b View the storage destinations in the Storage Destination panel
- c Click QR Client to return to the QR Client page.

As the images are copied, status information appears in the Query Retrieval Information panel.



---

**Note:** If you have problems connecting to the device, you may want to test the connection. See Section “Testing the connection” on page 154 for details.

---

## To sort the query retrieval information

To sort the information in the Query Retrieval Information panel, you can click Status, #, Source, Destination, Error, or ID.

## To cancel the retrieval

Click Cancel in the Query Retrieval Information panel.

## Receiving and sending image files

When you receive image files, you do not pose a query or retrieve files from a list; you passively receive the images that are sent to you from another device. You can receive images from any device, including a computer running another copy of MIPAV, if your DICOM Receiver is turned on and the appropriate connection information was entered in the hosts table.

You can send DICOM images to DICOM-compatible servers, imaging equipment, or to other MIPAV applications that are up and running. Only a copy of the image files are sent. the original files remain in your source directory.

### To receive image files

- 1 Turn on the DICOM receiver if you have not already done so.

To turn on the receiver, click File > DICOM Receiver On/Off in the MIPAV window. A check mark appears next to the command.



**Figure 108. DICOM Receiver On/Off command on the File menu in the MIPAV window**

- 2 Click Hosts. The Hosts page appears.
- 3 Make sure that the device that is sending the images has an entry in the Servers panel. (Conversely, your connection information should be in their hosts table.)
- 4 Make sure that the default storage destination in the Storage Destination panel is the location where you want to store the images.
- 5 Wait until the images are sent to you. After the images are sent, you can turn off the DICOM receiver by clicking File > DICOM Receiver On/Off in the MIPAV window.

## To send image files

- 1 Click Send. The Send page (Figure 109) appears.
- 2 Verify that the directory listed in Source directory is the directory in which the image files you want to send are located.

***If it is the correct directory,*** the image files that you want to send appear in the Listing panel.

***If it is not the correct directory,*** do either of the following:

- Click Browse to navigate to the correct directory.
- Type the full path of the directory in Source directory. Click Up Directory to view the parent directory.



**Figure 109. Send page in the DICOM Communications Panel dialog box**

<b>Source directory</b>	Indicates the full path name for the directory where the image files you want to send are kept. To change the source directory, use Browse or Up directory.
<b>Browse</b>	Allows you to navigate to the directory for the images you want to send. When you click this button, the Open dialog box appears.
<b>Up directory</b>	Moves to the parent directory of the directory shown in Source Directory.
<b>Refresh dir.</b>	Updates the image files shown in the Listing panel
<b>Listing panel</b>	Displays a read-only list of the image files in the source directory.
<b>Destination</b>	Indicates where the image files should be sent. Destinations in the drop down menu are the same as those listed in the hosts table ( <i>Server</i> panel).
<b>Send Images</b>	Transmits copies of the selected image files to the destination indicated in Destination.
<b>Test connection</b>	Tests the connection between your server, or device, and the receiving or sending device.
<b>Send status</b>	Displays messages about the send process, such as whether it was completed successfully.
<b>Clear</b>	Erases all messages from the Send status panel.

**Figure 109. Send page in the DICOM Communications Panel dialog box (continued)**

- 3 Select the destination to which you want to send the image files in Destination.



**Note:** The destinations reflect the entries in the Server panel on the Hosts page. If the destination does not appear in Destination, you need to create a new server in the Server panel on the Hosts page. For instructions, refer to "Setting up the hosts table" on page 144.

- 4 Select the images you want to send in the Listing panel.



**Tip:** To select more than one image file, hold down the <CTRL> or <SHIFT> key while you click the files you want to send.

- 5 Click Send Images to transmit copies of the selected images. Status messages that appraise you of the status of the send process appear in the Send status panel.



## Displaying and editing DICOM tag information

Once an image file is copied to the storage destination (usually your hard drive or a local device such as a zip drive), you can view and edit the information stored in the DICOM tags. As an option, you can display any of the DICOM tags as an overlay on the image, selecting the specific tags to display.

You can also use MIPAV's anonymize feature to protect patient confidentiality. The anonymize feature allows you to delete information from selected DICOM tags in a single step from one image or from a whole directory of images.

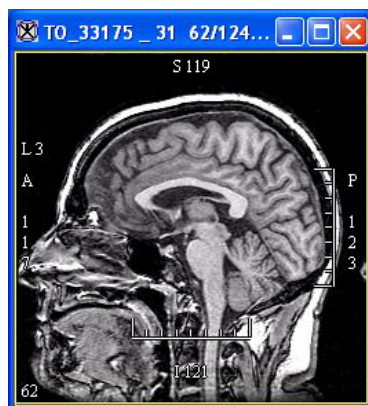
### To display the DICOM tags in an overlay over the image

- 1 Open a DICOM image in an image window.



**Note:** You can open a DICOM image file as you would any other image file. Refer to Chapter 3 for more details.

- 2 Select Image > Show Image/DICOM Overlay (if it is not already selected) in the MIPAV window. The image window opens with the DICOM information overlaying the image (Figure 110).

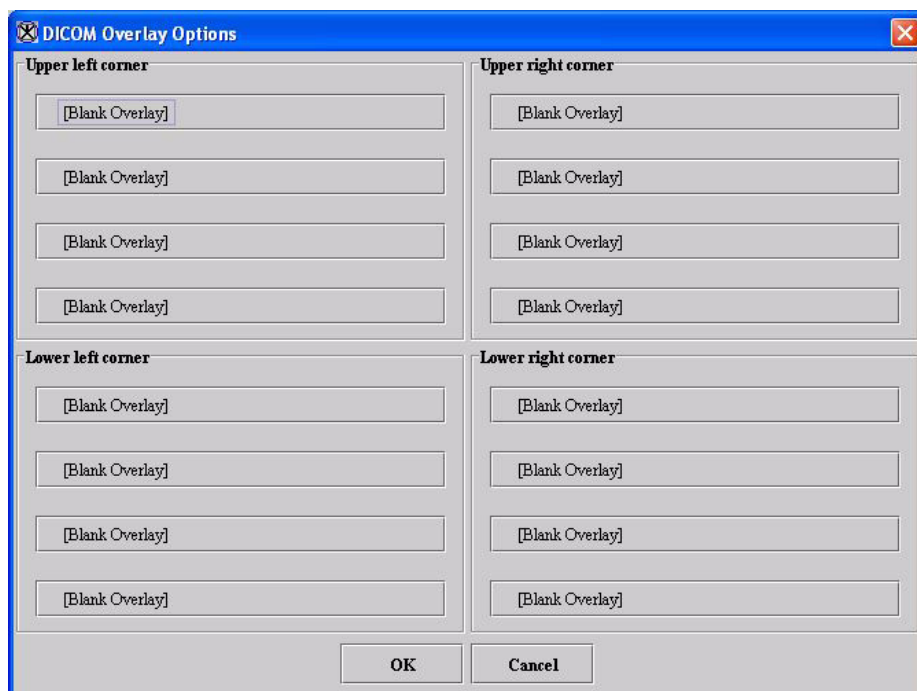


**Figure 110. Image with DICOM overlay**

## To choose which DICOM tags appear in the overlay

You may want only particular DICOM tags to appear in the overlay and at a specific spot in the overlay.

- 1 Open a DICOM image in an image window.
- 2 Select Image > Show Image/DICOM Overlay (if it is not already selected) in the MIPAV window. The image window opens with the DICOM information overlaying the image.
- 3 Select Image > DICOM Overlay Options. The DICOM Overlay Options dialog box (Figure 111) opens.
- 4 Decide where you want to display the DICOM tags—in the upper left corner, lower left corner, upper right corner, or lower right corner of the image.



### Upper left corner buttons

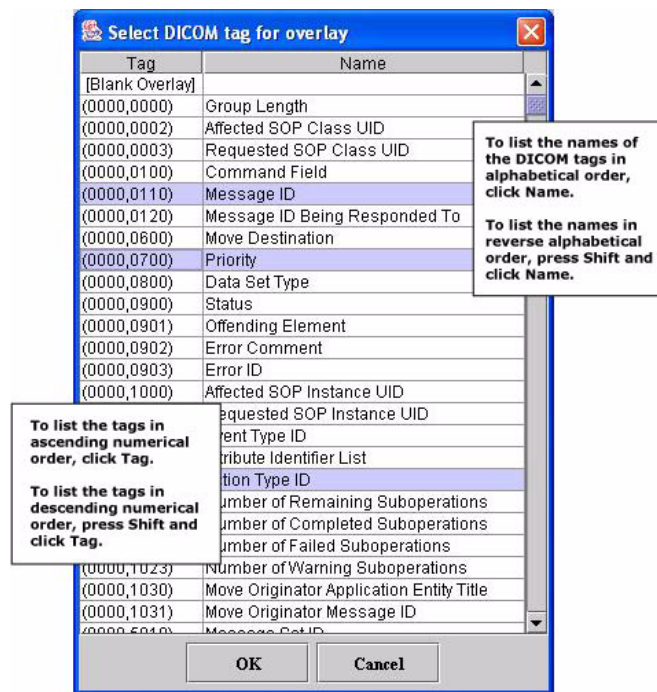
Specifies the DICOM tags you want to display in the upper left corner of the image. You can display from 1 to 4 DICOM tags.

**Figure 111. DICOM Overlay Options dialog box**

<b>Lower left corner buttons</b>	Specifies the DICOM tags you want to display in the lower left corner of the image. You can display from 1 to 4 DICOM tags.
<b>Upper right corner buttons</b>	Specifies the DICOM tags you want to display in the upper right corner of the image. You can display from 1 to 4 DICOM tags.
<b>Lower right corner buttons</b>	Specifies the DICOM tags you want to display in the lower right corner of the image. You can display from 1 to 4 DICOM tags.
<b>OK</b>	Displays the tag you selected on the button in the DICOM Overlay Options dialog box.
<b>Cancel</b>	Disregards any changes that you made in this dialog box and closes the dialog box.
<b>Help</b>	Displays online help for this dialog box.

**Figure 111. DICOM Overlay Options dialog box (continued)**

- 5 Select a button under the Upper left corner, Lower left corner, Upper right corner, or Lower right corner panel as appropriate. The Select DICOM Tag for Overlay dialog box (Figure 112) opens.



<b>Tag</b>	Lists each DICOM tag beside its name.
<b>Name</b>	Lists each DICOM name for the tag.
<b>OK</b>	Displays the tag you selected on the button in the DICOM Overlay Options dialog box.
<b>Cancel</b>	Disregards any changes that you made in this dialog box and closes the dialog box.
<b>Help</b>	Displays online help for this dialog box.

**Figure 112. Select DICOM Tag for Overlay dialog box**

- 6 Select the DICOM tag that you want to display in the overlay.
- 7 Click OK. The Select DICOM Tag for Overlay dialog box closes, and the selected DICOM tags and names appears on the buttons in the panel on the DICOM Overlay Options dialog box (Figure 113).



**Figure 113. Selected DICOM tags on buttons in the panel you chose**

- 8** Click OK. The DICOM Overlay Options dialog box closes. The tags you selected appear on the overlay on the image.



**Tip:** If you decide that you do not want the tag to display on the overlay, simply select the button in the DICOM Overlay Options dialog box and select [Blank Overlay] at the top of the Select DICOM Tag for Overlay dialog box.

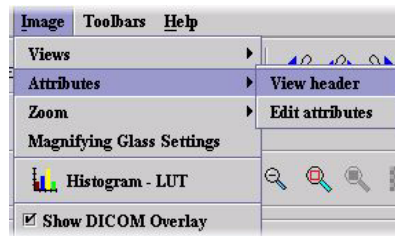
## To remove the DICOM tag overlay from the image

Show Image/DICOM Overlay is a toggle command. You click the command to turn it on or to turn it off. A check mark appears in the check box beside the command if it is on. To remove the DICOM tag overlay from the image, simply select Image > Show Image/DICOM Overlay to turn it off.

## To edit DICOM tag information

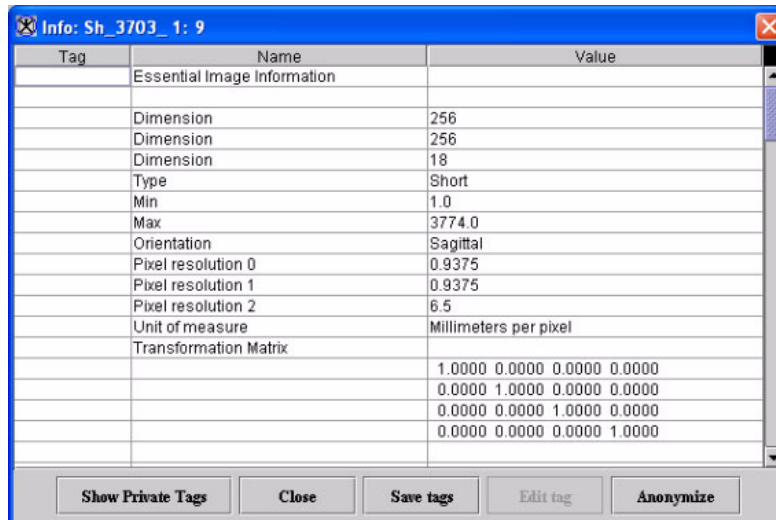
You can edit the information contained in the DICOM tags.

- 1** Open a DICOM image.
- 2** Click Image > Attributes > View Header.



**Figure 114. Attributes > View header commands on the Image menu in the MIPAV window**

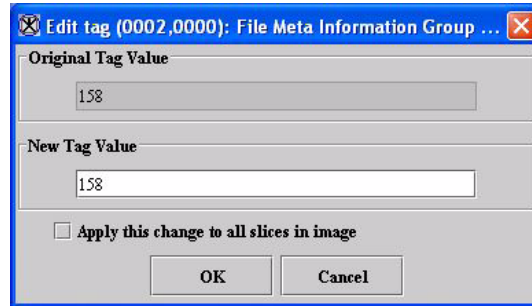
The Info dialog box opens (Figure 115).



<b>Tag column</b>	Lists the DICOM tags.
<b>Name column</b>	Lists the name of the DICOM tags.
<b>Value column</b>	Lists the value assigned to each DICOM tag.
<b>Show private tags</b>	
<b>Close</b>	Closes the dialog box.
<b>Save tags</b>	Saves the values of the tags that were changed.
<b>Edit tag</b>	Allows you to make changes to the values for the tags.
<b>Anonymize</b>	Anonymizes the image.

**Figure 115. Info dialog box (DICOM)**

- 3 Click Edit Tag. The Edit Tag dialog box appears (Figure 116).
- 4 Type the new value for the tag in New tag value.



**Figure 116.** Edit Tag dialog box for MR acquisition type tag



**Note:** You cannot edit the following tags in the Info window: Dimension, Type, Min, Max, Orientation, Pixel Resolution, Unit of Measure, and Transformation Matrix. The Dimension and Unit of Measure tags are edited in the Image Attributes window.

To apply the new tag value to all of the slices in the image dataset, click Apply this change to all slices in image.

- 5 Click OK. The tag information is changed.

## Protecting patient privacy using Anonymize

MIPAV's anonymize feature allows you to remove information from a selected subset of DICOM tags. The tags in this subset are those indicated in *DICOM Supplement 55: Attribute Level Confidentiality*. These tags include, but are not limited to, the patient's name, ID, birth date, sex, ethnic group, referring physician, age, size, weight, and occupation.

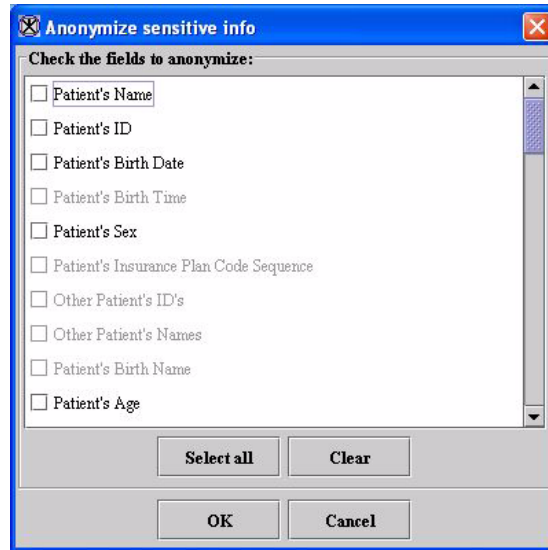
### To anonymize the current DICOM image

- 1 Open a DICOM image.
- 2 Click Image > Attributes > View Header in the MIPAV window. The Info dialog box opens.

**3** Click Anonymize.

Anonymize

The Anonymize Sensitive Info window appears (Figure 117).



**Figure 117. Anonymize sensitive info dialog box**

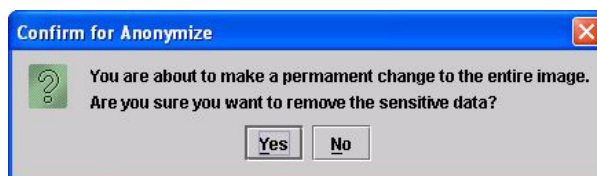
**4** Select the tags you want to anonymize.

- To select all of the tags, click Select all.
- To remove all of the check marks from the check boxes, click Clear.

The tags that are dimmed (appear grayed) are not included in the DICOM image file.



- 5 Click OK. A confirmation message appears (Figure 118).



**Figure 118. Confirm for Anonymize message**

- 6 Click OK.

The information in each specified tag is deleted from the image file. Although the information in these tags are cleared, the tags remain in the image file.



**Note:** The lists of tags in the Info dialog box does not update right away. Also, the name of the displayed image on the title bar is not saved into the file.

## To anonymize any image dataset

You can use the Anonymize command to anonymize several image series at one time.

- 1 Select File > Anonymize DICOM directory. The Choose Directory dialog box opens.



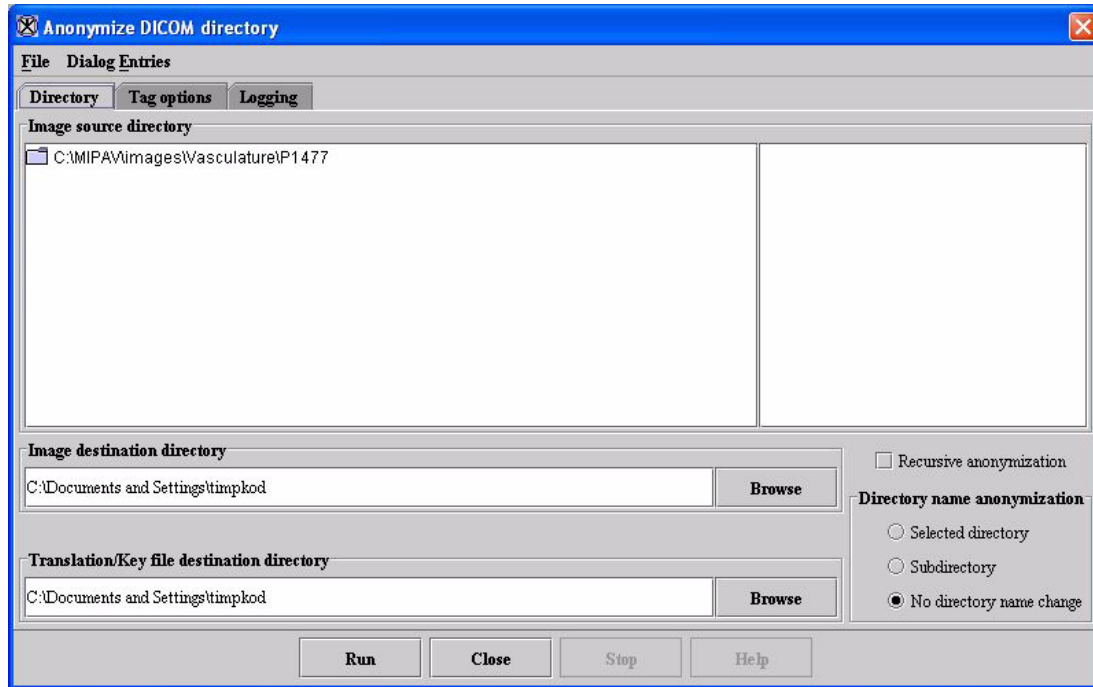
**Figure 119. Anonymize DICOM Directory command on the File menu in the MIPAV window**

- 2 Select a starting or root directory, which is a starting point for the selection. You can then select the image directories to anonymize.



**Note:** This function can recursively anonymize images in subdirectories of the root directory.

**3** Click Open. The Anonymize DICOM Directory window opens.



<b>File</b>	<p><b>New directory</b>—Allows you to select a new root directory to anonymize.</p> <p><b>Renew list</b>—Refreshes the file listing in Image source directory.</p>
<b>Dialog Entries</b>	<p><b>Clear Log Window</b>—Removes all of the log messages from the Logging page.</p>
<b>Image source directory</b>	Specifies the root directory to be anonymized.
<b>Image destination directory</b>	Specifies the root directory where the anonymized images should be stored.
<b>Browse</b>	Allows you to select a new image destination directory.
<b>Translation/key file destination directory</b>	Specifies the directory where the translation file is kept. The key file "patient.key.doc" is a text-formatted file that contains the name of the old file and its new name.
<b>Browse</b>	Allows you to select a new translation file directory.

**Figure 120. Directory page in the Anonymize DICOM Directory window**

<b>Recursive anonymization</b>	Processes images in the selected directory as well as any DICOM images in any subdirectories.
<b>Directory name anonymization</b>	<p><b>Selected directory</b>—Anonymizes the name of only the selected directory on the top level.</p> <p><b>Subdirectory</b>—Anonymizes the name of only the subdirectories.</p> <p><b>No directory name change</b>—Does not change the name of the directories.</p>
<b>Run</b>	Starts the process of anonymizing the images. Status messages appear on the Logging page.
<b>Close</b>	Closes this dialog box.
<b>Stop</b>	Stop the process of anonymizing the images.
<b>Help</b>	Displays online help for this dialog box.

**Figure 120. Directory page in the Anonymize DICOM Directory window (continued)**

**4** Click Open. The Anonymize DICOM Directory window opens.

The Anonymize DICOM window includes three tabbed pages:

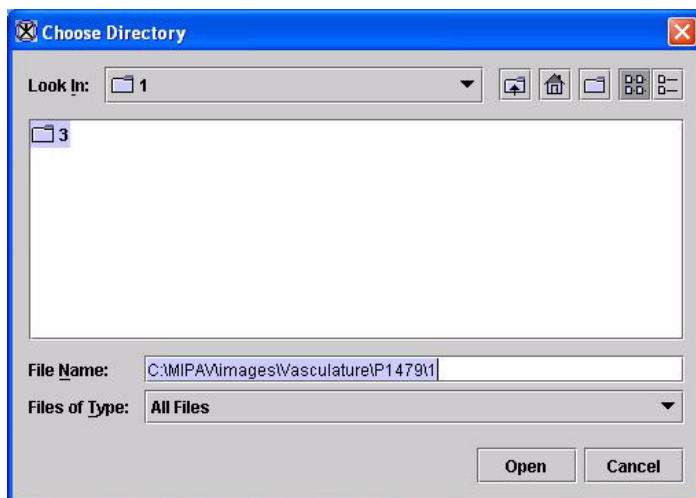
- **Directory page**—Allows you to select which images to process and where to place the output. This page is the page that is displayed when this window opens.
- **Tag Options page**—Allows you to select DICOM tags to remove from images and how to name anonymized images, which becomes a name tag.
- **Logging page**—Displays the current progress of the anonymization.

**5** Click File > New Directory (Figure 121).



**Figure 121. New directory command on the File menu in the Anonymize DICOM window**

The Choose Directory dialog box opens.



**Figure 122. Choose Directory dialog box**

**6** Select one or more source directories to anonymize.

The directories may be as deeply nested as needed. You may select directories on different levels; however, do not select a directory nested within another selected directory.

**7** Click Open. The directory listed in Image source directory changes to the display the directory or directories you chose.

**8** Select Recursive anonymization if you want to process directories recursively.



**Note:** When this check box is selected, MIPAV processes images in the selected directory as well any DICOM images in any subdirectories. When this check box is clear, MIPAV only processes the images in the directory that is selected, regardless of any subdirectories.

**9** Select one of the following:

- Selected directory
- Subdirectory
- No directory name change

**10** Click Browse beside Image destination directory. The Select Destination Directory dialog box opens.

**11** Select a destination directory.



**Example:** The number of image directories chosen affect precisely where the processed images are stored. When one directory is chosen as the source in step 6, all anonymized DICOM files are placed directly in the chosen destination directory. However, selecting more than one source directory in step 6, the anonymized DICOM files are placed into subdirectories of the Destination directory (refer to the following table).

If you select . . .		Then files are placed in . . .
Source directories	/images/a	/destination/a
	/images/b	/destination/b
Destination directory	/destination	



**Note:** The name of the anonymized files depend on the anonymous name, which is set later.

**12** Click Select. The directory you selected appears in the Image destination directory box. It also replaces the name in the Translation/Key file destination directory box.

**13** Decide where to store the translation/key file.



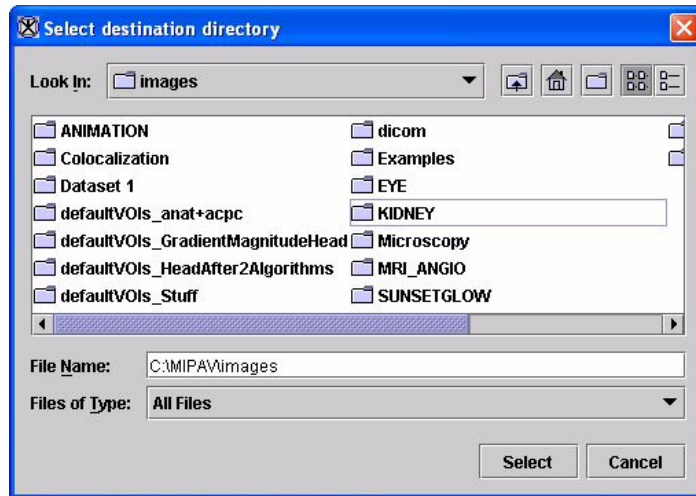
**translation/key file**—Records the original names in the files and correlates them to the new anonymous names. The name of the key file is patient.key.doc.

By default, the translation/key file is kept in the same directory as the images; however, if this is undesirable, you may choose a new location for the file. If you decide to change the location, go to the next step. If you decide against changing the location, go to step 17.

**14** Click Browse beside Translation/Key file destination directory if you want to select another destination for the translation/key file. The Select Destination Directory dialog box (Figure 123) opens.

**15** Select a directory.

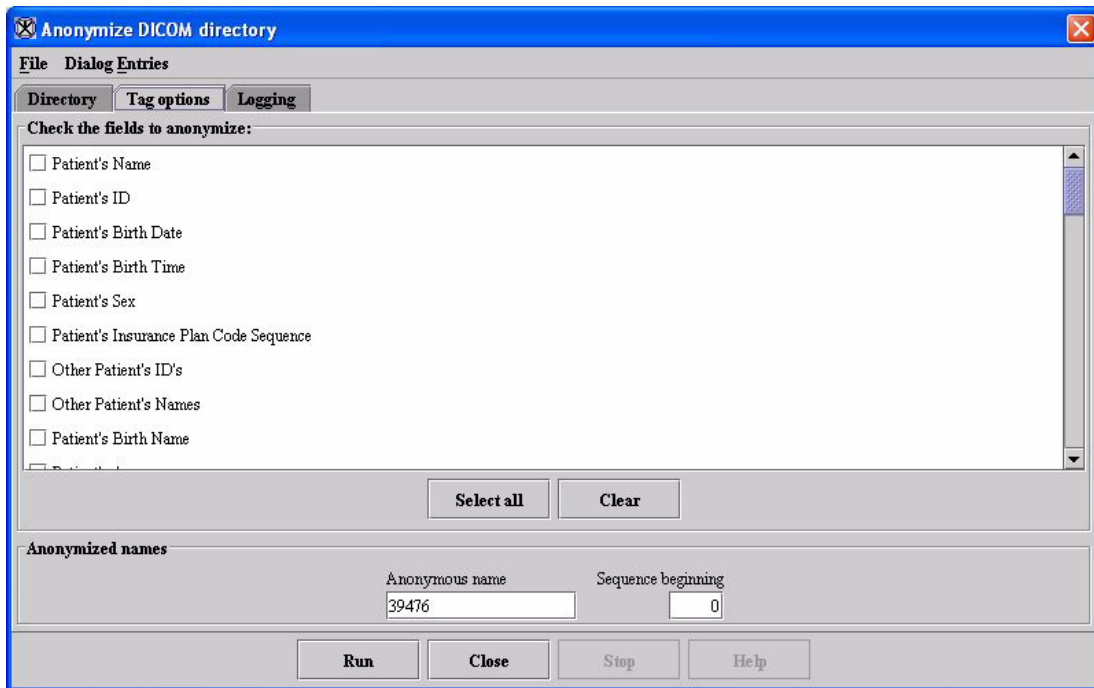
- 16 Click Select. The new destination appears in the Translation/Key File destination directory box.



**Figure 123. Select Destination Directory dialog box**

- 17 Click Tag Options to display the Tag Options page (Figure 124).

The directory selection process on the Directory page provides the images to anonymize and the location of where to put them when done. However, it does not select what to remove from the images or what information to call the images when done. This is the goal of the Tag Options page. It allows you to choose the tags to remove from the images being processed and it gives you the opportunity to give an easily remembered name to the destination images.



<b>Check the fields to anonymize</b>	Allows you to anonymize only the specific tags that you select. You can select only one tag or as many as needed.
<b>Select all</b>	Specifies that you want to anonymize all of the tags listed. When you select this button, MIPAV places a check mark in each of the check boxes.
<b>Clear</b>	Removes the check marks from all of the check boxes.
<b>Anonymized names</b>	<p><b>Anonymous name</b>—Specifies a first part of the name assigned to the image files. MIPAV uses a combination of this name and the sequence number specified in Sequence beginning.</p> <p><b>Sequence beginning</b>—Indicates the starting number for the series of image files. The default number is 0.</p>
<b>Run</b>	Starts the process of anonymizing the images. Status messages appear on the Logging page.
<b>Close</b>	Closes this dialog box.
<b>Stop</b>	Stop the process of anonymizing the images.
<b>Help</b>	Displays online help for this dialog box.

**Figure 124. Tag Options page in the Anonymize DICOM Directory window**

**18** Select the DICOM tags you want to anonymize.

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To select all of the tags, click Select all.

To remove all of the tags, click Clear.

- 19** Type the anonymous name for the image files in Anonymous name.

By default, a preset random value appears in Anonymous name, but you can replace this value with a more familiar name.

- 20** Type a value in Sequence beginning.

When more than one image source directory is chosen, the sequence beginning number affects the name of the image file. The first image set is given the sequence number; the next image is given a number one higher.



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**Example:** The first image set is titled d0884\_0. The second image set was chosen to be anonymized at the same time, it would be saved d0884\_1.

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- 21** Click Directory to return to the Directory page.

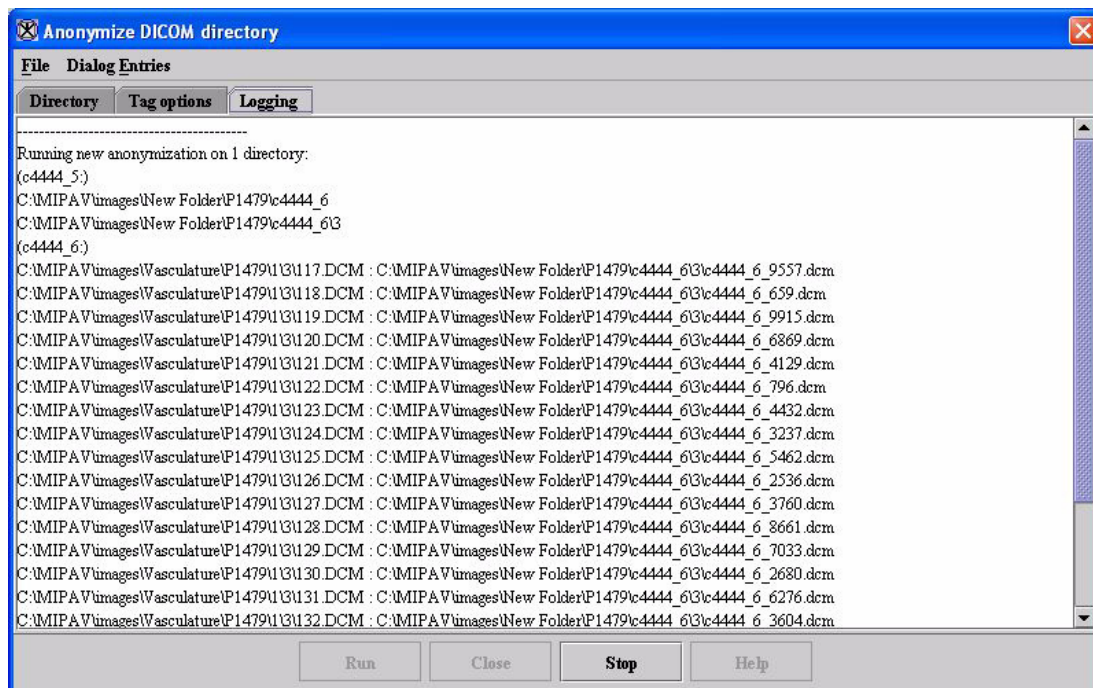
- 22** Select the directories in the Image source directory table that you want to anonymize.

- 23** Click Run. MIPAV displays the Logging page (Figure 125), where it displays messages about each of the images being processed until they are all processed.

To stop the process, click Stop.

To close the Anonymize DICOM Directory window after all images are processed, click Close.





**Figure 125. The Logging page in the Anonymize DICOM Directory window listing processing messages and MIPAV removes tags**

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## Converting non-DICOM image files to DICOM format

You can convert a non-DICOM file, such as a TIFF or Analyze file, to DICOM format.

### To convert a non-DICOM image file to DICOM

- 1 Open a non-DICOM image.
- 2 Click File > Save Image As in the MIPAV window. The Save window appears.
- 3 Select the directory where you want to store the dataset.



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**Tip:** If you are converting an image dataset that has more than one file, you may want to save the files to a new folder. To do this, select Create New Folder at the top right of the dialog box.

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- 4 Type the name of the file, including the file extension of .dcm in File Name.
- 5 Click Save. The Attributes to Save dialog box appears.

You need to enter DICOM tag information in this dialog box, which has the following four pages:

- Required page (Figure 126)
  - Patient page (Figure 127)
  - Study page (Figure 128)
  - Series page (Figure 129)
- 6 Enter the required information on the Required page (Figure 126).

Although the fields on the Patient, Study, and Series pages are optional, you must furnish all of the information on the Required page before you can convert the file.
  - 7 Enter the information, if desired, on the Patient, Study, and Series pages (Figure 127, Figure 128, and Figure 129).

<b>Study Instance UID (0020,000D)</b>	Unique identifier for the study. Only numeric characters with optional periods are allowed.
<b>Modality (0008,0060)</b>	Type of equipment that was used to acquire the data used to create the images in the dataset. Options are: Biomagnetic Imaging, Color Flow Doppler, Computed Tomography, Duplex Doppler, Computed Radiography, Diaphanography, Digital Radiography, Endoscopy, General Microscopy, Hard Copy, Intraoral Radiography, Laser Surface Scan, MR Angiography, Mammography, Magnetic Resonance, MR Spectroscopy, Nuclear Medicine, Other, PET, Panoramic X Ray, Radio Fluoroscopy, Radiographic Imaging, Radiotherapy Dose, Radiotherapy Image, Radiotherapy Record, Radiotherapy Structure, Slide Microscopy, SPECT, Thermography, Ultrasound, X Ray Angiography, and External Photography.
<b>Series Instance UID (0020,000E)</b>	Unique identifier for the study. Only numeric characters (with optional periods) are allowed.
<b>OK</b>	Applies the tags that you specified and closes this dialog box.
<b>Cancel</b>	Disregards any changes you made in this dialog box, closes the dialog box, and does not apply any of the tags.
<b>Help</b>	Displays online help for this dialog box.
<b>Fill tags</b>	Allows you to specify a file that contains the DICOM tags. When you select this button, the Open Tags File dialog box appears.

**Figure 126. Required page in the Attributes to Save dialog box**

<b>Patient's Name (0010,0010)</b>	Patient's full name.
<b>Patient's Birth Date (0010,0030)</b>	Date of patient's birth.
<b>Patient's Birth Time (0010,0032)</b>	Time of patient's birth.
<b>Other Patient Names (0010,1001)</b>	Other names used to identify the patient.
<b>Patient Comments (0010,4000)</b>	User-defined comments about the patient.
<b>Patient ID (0010,0020)</b>	Primary hospital identification number or code used to identify the patient.
<b>Patient's Sex (0010,0040)</b>	Gender of the patient. Options are: Unknown, Male, Female, and Other.
<b>Other Patient IDs (0010,1000)</b>	Other IDs used to identify the patient.
<b>Ethnic Group (0010,2160)</b>	Ethnic group or race of the patient.
<b>Patient Orientation (0020,0020)</b>	Patient direction of the rows and columns of the image.
<b>OK</b>	Applies the tags that you specified and closes this dialog box.
<b>Cancel</b>	Disregards any changes you made in this dialog box, closes the dialog box, and does not apply any of the tags.
<b>Help</b>	Displays online help for this dialog box.
<b>Fill tags</b>	Allows you to specify a file that contains the DICOM tags. When you select this button, the Open Tags File dialog box appears.

**Figure 127. Patient page in the Attributes to Save dialog box**

**Attributes to save**

Required Patient **Study** Series

Study ID (0020,0010):	<input type="text"/>	Study Date (0008,0020):	<input type="text"/>
Study Time (0008,0030):	<input type="text"/>	Accession Number (0008,0050):	<input type="text"/>
Study Description (0008,1030):	<input type="text"/>	Referring Physician's Name (0008,0090):	<input type="text"/>
Physician(s) of Record (0008,1048):	<input type="text"/>	Physician(s) Reading Study (0008,1060):	<input type="text"/>
Admitting Diagnoses Description (0008,1080):	<input type="text"/>	Patient's Age (0010,1010):	<input type="text"/>
Patient's Size (0010,1020):	<input type="text"/>	Patient's Weight (0010,1030):	<input type="text"/>
Occupation (0010,2180):	<input type="text"/>	Additional Patient's History (0010,21B0):	<input type="text"/>

OK Cancel Fill tags ...

<b>Study ID (0020,0010)</b>	User- or equipment-generated study identifier.
<b>Study Time (0008,0030)</b>	Time the study started.
<b>Study Description (0008,1030)</b>	Institute-generated description or classification of the study (component) performed.
<b>Physician(s) of Record (0008,1048)</b>	Physician responsible for the overall patient care at the time of the study.
<b>Admitting Diagnoses Description (0008,1080)</b>	Description of the admitting diagnoses.
<b>Patient's Size (0010,1020)</b>	Length or size of the patient in meters.
<b>Occupation (0010,2180)</b>	Occupation of the patient.
<b>Study Date (0008,0020)</b>	Date the study started.
<b>Accession Number (0008,0050)</b>	An RIS-generated number which identifies the order for the study.
<b>Referring Physician's Name (0008,0090)</b>	Patient's referring physician.
<b>Physician(s) Reading Study (0008,1060)</b>	Physician(s) reading the study.
<b>Patient's Age (0010,1010)</b>	Age of the patient.
<b>Patient's Weight (0010,1030)</b>	Weight of the patient, in kilograms.
<b>Additional Patient's History (0010,21B0)</b>	Additional information about the patient's history.

**Figure 128. Study page in the Attributes to Save dialog box**

<b>OK</b>	Applies the tags that you specified and closes this dialog box.
<b>Cancel</b>	Disregards any changes you made in this dialog box, closes the dialog box, and does not apply any of the tags.
<b>Help</b>	Displays online help for this dialog box.
<b>Fill tags</b>	Allows you to specify a file that contains the DICOM tags. When you select this button, the Open Tags File dialog box appears.

**Figure 128. Study page in the Attributes to Save dialog box (continued)**

<b>Series Number (0020,0011)</b>	A number that identifies this series.
<b>Performing Physicians' Name (0008,1050)</b>	Name(s) of the physician(s) administering the series.
<b>Series Description (0008,103E)</b>	User-provided description for the series.
<b>Body Part Examined (0018,0015)</b>	A text description of the body part that was examined. Options are: Unknown, Skull, CSpine, TSpine, LSpine, SSpine, Coccyx, Chest, Clavicle, Breast, Abdomen, Pelvis, Hip, Shoulder, Elbow, Knee, Ankle, Hand, Foot, Extremity, Head, Heart, Neck, Leg, Arm, and Jaw.
<b>Smallest Pixel Value (0028,0108)</b>	Minimum value of all images in this series.
<b>Procedure Step ID (0040,0253)</b>	Identification of that part of a procedures that was performed during this step.
<b>Procedure Step Start Time (0040,0245)</b>	Time when the procedure step started.

**Figure 129. Series page in the Attributes to Save dialog box**

<b>Laterality (0020,0080)</b>	Options are: Unknown, Left, and Right.
<b>Series Time (0008,0031)</b>	Time series started.
<b>Protocol Name (0018,1030)</b>	User-defined description of the conditions under which the series was performed.
<b>Operator's Name (0008,1070)</b>	Name(s) of the technologist(s) supporting the series.
<b>Patient Position (0018,5100)</b>	Patient position relative to the imaging-equipment space. Options are: Unknown, Head-First Prone, Head-First Supine, Feet First-Prone, Feet First-Supine, HF-Decubitus Right, HF-Decubitus Left, FF-Decubitus Right, FF-Decubitus Left.
<b>Largest Pixel Value (0028,0109)</b>	Maximum value of all images in this series.
<b>Procedure Step Start Date (0040,0244)</b>	Date when the procedure step started.
<b>Procedure Step Description (0040,0254)</b>	Institute-generated description or classification of the procedure step that was performed.
<b>OK</b>	Applies the tags that you specified and closes this dialog box.
<b>Cancel</b>	Disregards any changes you made in this dialog box, closes the dialog box, and does not apply any of the tags.
<b>Help</b>	Displays online help for this dialog box.
<b>Fill tags</b>	Allows you to specify a file that contains the DICOM tags. When you select this button, the Open Tags File dialog box appears.

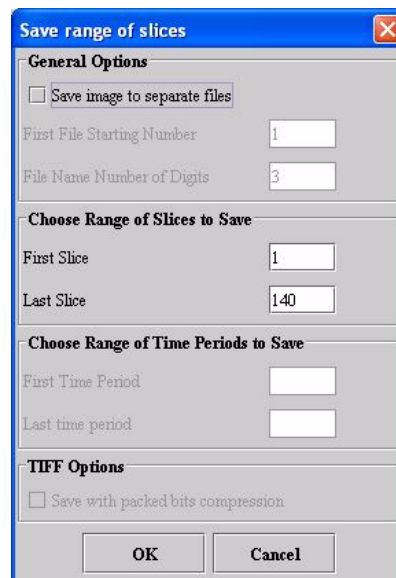
**Figure 129. Series page in the Attributes to Save dialog box (continued)**

**8** Click OK.

If you are converting a dataset that has more than one slice, the Save Range of Slices dialog box (Figure 130) appears.

**9** Complete the dialog box.

<b>Save image to separate files</b>	Saves each image slice to a separate file.
<b>First File Starting Number</b>	Specifies the starting number for the first file.
<b>File Name Number of Digits</b>	Specifies the number of digits in the file name.
<b>First slice</b>	Specifies the number of the first slice.
<b>Last slice</b>	Specifies the number of the last slice.
<b>First time period</b>	Specifies the first time period.
<b>Last time period</b>	Specifies the last time period.
<b>Save with packed bits compression</b>	Indicates to save the TIFF files with packed bits compression.
<b>OK</b>	Applies the parameters you specified and closes this dialog box.
<b>Cancel</b>	Disregards any changes you made in this dialog box, closes the dialog box, and does not apply any of the changes.
<b>Help</b>	Displays online help for this dialog box.



**Figure 130. Save Range of Slices dialog box**

**10** Click OK when complete.

The dataset is converted to DICOM format and saved in the directory you specified.

If you are converting a dataset that has several images, each file is sequentially numbered. For example, doetumor001.dcm, doetumor002.dcm, doetumor003, and so on.